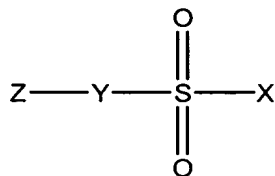


CLAIMS

1. A plant cell surface comprising an effective amount of bioavailable anti-fouling compound represented by general structure 1:



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wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR;

Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or $-(\text{CH}_2)_m\text{-R}_{80}$;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or $-(\text{CH}_2)_m\text{-R}_{80}$;

R_{80} represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

m is an integer in the range 0 to 8 inclusive, or a salt thereof,

wherein the compound or a biologically active fragment thereof can be released from the surface in the presence of a liquid or vapor.

2. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br.

3. A plant cell surface of claim 1, wherein Y represents O.

4. A plant cell surface of claim 1, wherein Z represents optionally substituted alkyl, aryl, or $-(\text{CH}_2)_m\text{-R}_{80}$.

5. A plant cell surface of claim 1, wherein Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

6. A plant cell surface of claim 1, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

7. A plant cell surface of claim 1, wherein R represents H or alkyl.

8. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Y represents O.

9. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Y represents O.

10. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

11. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

12. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

13. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

14. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

15. A plant cell surface of claim 1, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

16. A plant cell surface of claim 1, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

17. A plant cell surface of claim 1, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

18. A plant cell surface of claim 1, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

19. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

20. A plant cell surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

21. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

22. A plant cell surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

23. A plant cell surface of claim 1, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

24. A plant cell surface of claim 1, wherein X represents -OH or Cl; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

25. A plant cell surface of claim 1, wherein the surface is a coating.

26. A plant cell surface of claim 25, wherein the coating is temporary

27. A plant cell surface of claim 25, wherein the coating is semi-permanent.

28. A plant cell surface of claim 25, wherein the coating is permanent.

29. A plant cell surface of claim 1, wherein the effective amount reduces the number of plant pathogens on a plant cell surface over a defined period of time by a factor of 4 relative to a control plant cell, which does not comprise the compound.

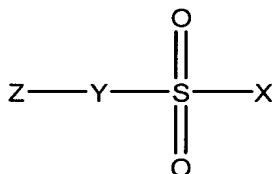
30. A plant cell surface of claim 1, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 8 relative to a control plant cell, which does not comprise the compound.

5 31. A plant cell surface of claim 1, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 10.

32. A plant cell surface of claim 1, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 15.

10 33. A plant cell surface of claim 1, wherein the release of the compound is at a constant rate. *PAB*

34. A coating for contacting a plant cell surface comprising an effective amount of an anti-fouling compound represented by general structure 1:



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wherein

X represents -OH, -O(aryl), -O(acyl), -O(sulfonyl), -CN, F, Cl, or Br;

Y represents O, S, Se, or NR₂;

20 Z represents optionally substituted alkyl, heteroalkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or -(CH₂)_m-R₈₀;

R represents independently for each occurrence hydrogen, alkyl, heteroalkyl, aryl, heteroaryl, aralkyl, heteroaralkyl, or -(CH₂)_m-R₈₀;

R₈₀ represents independently for each occurrence aryl, cycloalkyl, cycloalkenyl, heterocyclyl, or polycyclyl; and

m is an integer in the range 0 to 8 inclusive or a salt thereof ,
 wherein the coating releases the compound or a biologically active fragment thereof when in
 contact with a liquid or vapor.

5 35. A coating of claim 34, wherein X represents -OH, F, Cl, or Br.

36. A coating of claim 34, wherein Y represents O.

10 37. A coating of claim 34, wherein Z represents optionally substituted alkyl, aryl, or -
 $(CH_2)_m-R_{80}$.

38. A coating of claim 34, wherein Z represents optionally substituted alkylphenyl,
 heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

15 39. A coating of claim 34, wherein Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-
 (1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-
 phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

40. A coating of claim 34, wherein R represents H or alkyl.

20 41. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Y represents O.

42. A coating of claim 34, wherein X represents -OH or Cl; and Y represents O.

25 43. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents
 optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

44. A coating of claim 34, wherein X represents -OH or Cl; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

45. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

46. A coating of claim 34, wherein X represents -OH or Cl; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

47. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

48. A coating of claim 34, wherein X represents -OH or Cl; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

49. A coating of claim 34, wherein Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

50. A coating of claim 34, wherein Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

51. A coating of claim 34, wherein Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

52. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

53. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkyl, aryl, or $-(CH_2)_m-R_{80}$.

54. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

55. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents optionally substituted alkylphenyl, heteroalkylphenyl, arylphenyl, or heteroarylphenyl.

56. A coating of claim 34, wherein X represents -OH, F, Cl, or Br; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

57. A coating of claim 34, wherein X represents -OH or Cl; Y represents O; and Z represents methyl, octyl, 4-(2-methylpropyl)phenyl, 4-(1,1-dimethylethyl)phenyl, 4-(1,1-dimethylpropyl)phenyl, 4-pentylphenyl, 4-(1-methyl-1-phenylethyl)phenyl, or 4-(1-methylheptyl)phenyl.

58. A coating of claim 57, wherein the coating is temporary.

59. A coating of claim 57, wherein the coating is semi-permanent.

60. A coating of claim 57, wherein the coating is permanent.

61. A coating of claim 34, wherein the effective amount reduces the number of plant pathogens on a plant cell surface over a defined period of time by a factor of 4 relative to a control plant cell, which does not comprise the compound.

5 62. A coating of claim 34, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 8 relative to a control plant cell, which does not comprise the compound.

10 63. A coating of claim 34, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 10.

64. A coating of claim 34, wherein the effective amount reduces the number of pathogens on a plant cell surface over a defined period of time by a factor of 15.

15 65. A coating of claim 34, wherein the release of the compound is at a constant rate

66. A coating of claim 34, which is a liquid.

67. A coating of claim 34, which is a gas or vapor.

68. A coating of claim 34, which is a paste or other semi-solid state.

69. A coating of claim 34, which is a solid.

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70. A coating of claim 34, which is a liquid and solidifies into a hard coating on a surface.